

**CAPITAL ASSET PRICING MODEL IN FIRMS****Dr.D.Seethanaik**Assistant Prof. Dept of MBA  
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This paper is to measures the return on selected securities. The paper focuses on evaluation the performance of stock using CAMP model. This paper examines whether securities are overvalued or undervalued in the market. The paper measures the systematic risk of the security by using beta as a risk. And also paper calculated expected risk of return the by investors.

**Key words :** CAMP, Risk, Beta, Overvalued, Under valued

**Introduction**

Investing in a stock primarily involves prediction of its future position. The returns on stocks are linked to the fortunes of individual companies, rather than to the economy as whole. The fact that most investor do not place his available funds in few stocks providing higher returns, suggests that other factor must be considered besides return in the selection process.

Investor wants to maximize expected return subject to tolerance of their risk. The risk associated with the holding in that the return that is achieved will be less than the return that was expected. Thus, here lies importance of analysing securities within a risk return context.

Investors invest their funds on the assets with anticipation of future returns. In the real business world, we could find great investment opportunities. Investment is the sacrifice of certain present value for the uncertain future reward. It entails arriving at numerous decisions such as type, mix, amount, time, grade etc. of investment and disinvestment. In borders sense an investment decision is the trade-off between risk and return.

The development of Capital Asset Pricing Model, popularly known as CAPM has been successful one in the context of measurement of risk and return of an investment decision when used judiciously and cautiously.

CAPM provide a logical and quantitative approach for estimation of risk. It provides the decision makers with useful estimates of the required rate of return o risky securities on capital budgeting project. It answers to the investor"s queries as where to invest how to invest and what discount rate to use for project cash flows.

**PROBLEM STATEMENT:**

The question of what determines the equilibrium prices in the stock market, or what is the right price for an investor to buy or sell a stock in the stock market, leads to the question of what risk factors investors have to consider, or should consider, in determining their expected rates of return from the stocks. The highlights the need to have a suitable model that can identify such risk factors and explain how investor"s expected rate of returns are determined. The overextended stock prices in the second half of the 1990s which led to the stock market collapse of the year 2000 casts doubts on the ability of the single-factor CAPM to explain how investor"s return expectations are formed and thus its inability to explain and predict the stock prices. Therefore, the problem to be addressed in this study is the inability of the single-factor CAPM to identify relevant risk factors that investors consider in forming their return expectations and relationships between those relevant risk factors and return expectations.

**OBJECTIVES OF THE STUDY:**

1. To measure the return on selected securities.

2. To evaluate the performance of stock using CAPM model.
3. To find whether securities are overvalued or under valued in the market.
4. To measure the systematic risk of the security by using beta as a measure of risk.
5. To calculate expected risk of return expected by investors on security for any level of risk.

### SCOPE OF THE STUDY:

1. The study is confined to the statistics of selected stocks of banking, telecommunication service, IT service and automobiles sectors.
2. The beta is calculated on the return on the limited period as share prices for the periods of 60 months
3. Only secondary sources data is used for the study, which limits the scope, of the research work.
4. The index selected is Nifty NSE. The changes in index could affect in discrepancies in the result obtained.
5. The selected stocks are listed in National Stock Exchange (NSE).

### RESEARCH METHODOLOGY

#### Research Design:

The empirical research methodology is used to test CAPM empirical research methods are a class of research methods in which empirical observations or data collected in order to answer particular research question. The study is conducted on selected securities listed in BSE and are analysed whether the securities have provided sufficient returns for the risk involved with it is securities has been carried out for the period of five years[from 2010-2014].

CAPM in an ex-ante model where expected returns on an asset is equated to some combination between  $R_f$  and market portfolio. However, testing of CAPM has to be necessarily export. Expected return is assumed to be adequately reflected in historical export return. The testing consists of sets of regression.

Monthly return data, used to test the CAPM model. The return for stock of month of e.g January is calculated as follows.

$$R_i = \frac{PE - PB}{PB}$$

Where PE is price of stock a month end, PB is beginning price.  $R_i$  is return on that security of that month.

#### Sampling Design:

The sample size taken for conducting research in three companies from the sectors. The sample is screened to include only those scripts which have been quoted at least is 60 months out of any consequent 72 months period during the entire 6 years period of the study.

#### Sources and methods of data collection:

Every data regarding the study has been obtained through secondary source. Such as visiting stock broking, centres magazines, internet, report. Securities data regarding 60 monthly share prices have collected from websites used to compute holding period return.

The data on stock have been considered quantitative technique of data analysis has been adopted for the study. We have used statistical tools such as geometric mean, regression analysis. We have used SPSS software to compute data.

SECTORS	FIRMS
BANKING	CANARA BANK
AUTOMOBILES	TVS MOTORS LTD
IT	TCS LTD

### LIMITATION OF THE STUDY

1. As consider beta only, the bonus shares issued not considered.
2. The dividends issued on the share are also taken in to account, since the effect on the return on the share would be minimal.
3. There may be a variation in calculation because we have tested the CAPM using ex post data, than ex ante data.
4. Unfortunately procedure is no very practical since informs on investor expectation is very sketchy.
5. As the sample selected being to small a generation cannot be arrived at for entire security.

### FINDINGS

This chapter is focuses on the test of the CAPM by using the methods mentioned in the last chapter; furthermore, brief interpretations are followed at each section.

### OVERVIEW OF CANARA BANK LIMITED

Canara Bank (Canara), one of the biggest commercial banks in India, was established in 1906 at Mangalore, Karnataka by Mr. Ammembal Subba Rao Pai. It was nationalised in 1969 with 13 other banks. Canara has a pan-India presence with a network of 3,046 branches as on March 31, 2010. The bank's branches are well-spread across metropolitan, urban, semi-urban and rural areas.

Among the Top 5 banks in India Canara is India's fifth largest bank in terms of asset size; as on March 31, 2010, it had an asset base of around Rs 2.6 trillion. The bank's strong market position is underpinned by its market share of over 4.8% in deposits and advances, and its pan-India branch network. The bank's advances and deposits registered a compound annual growth rate (CAGR) of 20% and 18%, respectively, over the past three years. Deposits and advances grew 25.5% and 22.5%, respectively, year-on-year in FY10. Canara's revenue profile is diversified across businesses, products, and geographies. As on March 31, 2010, retail advances constituted 15% of the bank's total advances, against an industry average of around 20%. Housing loans (direct) accounted for 42% of the retail portfolio as compared to 37% on March 31, 2009.

### Business summary

- Canara Bank provides various banking products and services in India. It offers personal banking services, including savings,
- current, and salary accounts, as well as re-investment plans, tax saver and gold schemes, recurring deposits, deposit schemes for senior citizens and children, unclaimed deposits, and fixed deposits; and loan products, such as housing, home improvement, vehicle, site, personal, teachers, gold, online education, property, and consumer loans, as well as loans against shares/debentures/bonds/units, loans for senior citizens and owners of the property against rents receivable, mortgages, reverse mortgage loans for senior citizens, and loans for medical practitioners.

- The company's personal banking services also comprise ATM and debit cards, credit cards, inter-bank funds transfer services, mutual funds, insurance, foreign exchange and international banking services, and consultancy and depository services, as well as safe deposit lockers, custody services, and retail sale of gold coins. In addition, it provides corporate banking services, such as current, fixed, and recurring deposits, as well as re-investment plans; term loans, working capital and export finance, and infrastructure finance; cash management and syndication services; IPO monitoring and merchant banking services; Internet banking; and technology upgradation fund schemes.

**Table 1: Overall Market Returns Estimation for the year 2010-2014**

YEAR	RETURN	RELATIVE RETURN
2010	0.6874346	1.687435
2011	-0.306759	0.693241
2012	0.1420772	1.142077
2013	-0.507986	0.492014
2014	0.6287923	1.628792
<b>MARKET RETURN %</b>	<b>1.37476</b>	

**CALCULATION OF BETA**

$$\beta = \text{COV}(R_j, R_m) / \sigma_m^2$$

$$\sigma_m^2 = 0.0004$$

$$\beta = 2.0662$$

**CALCULATION OF EXPECTED RETURN**

$$R_f = 8\%$$

$$E(R_m) = 8.45$$

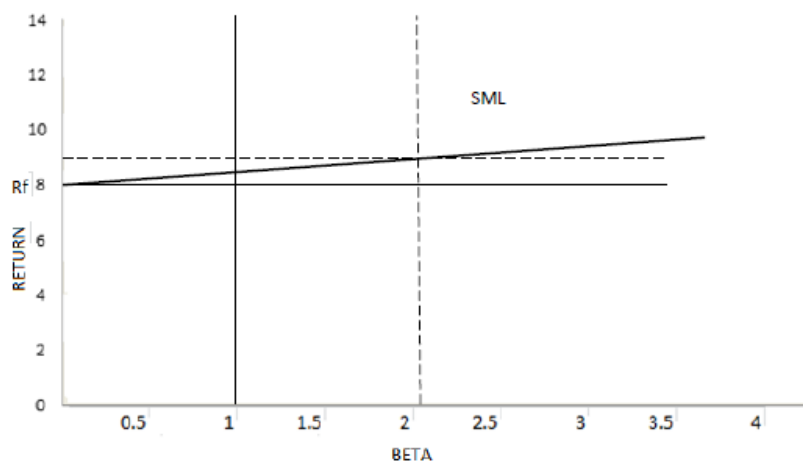
$$\beta = 2.0662$$

$$R_j = R_f + \beta * [R_m - R_f]$$

$$= 8 + 2.0662 * [8.45 - 8]$$

$$= 8 + (0.9297)$$

$$R_j = 8.927$$

**SECURITY MARKET LINE OF CANARA BANK****Figure 1: Security Market Line of Canara Bank**

- The stock of **CANARA BANK** has been under priced. Therefore investor will buy the stock.

- The expected return of CANARA BANK is 8.927 and beta is 2.0662. The expected return is above the Security Market Line. Therefore it is to be under valuation of stock.

### OVERVIEW OF TVS MOTOR COMPANY LIMITED:

- TVS Motor Company Ltd, the flagship company of TVS Group is the third largest two-wheeler manufacturer in India. The company manufactures a wide range of two-wheelers from mopeds to racing inspired motorcycles. The company is having their manufacturing plants at Hosur in Tamilnadu, Mysore in Karnataka and Solan in Himachal Pradesh. They are also having one unit located at Indonesia. Their subsidiaries include Sundaram Auto Components Ltd, TVS Motor Company (Europe) BV, TVS Motor (Singapore) Pte Ltd, PT TVS Motor Company, Indonesia, TVS Energy Ltd and TVS Housing Ltd. TVS Motor Company Ltd is a part of Sundaram Clayton group in TVS group of companies.
- Over the years TVS Motor has grown to be the largest in the group, both in terms of size and turnover, with four state of the art [9] manufacturing plants in Hosur, Mysore and Nalagarh in India and Karawang in Indonesia. TVS Motor is credited with many innovations in the Indian automobile industry, notable among them being the introduction of India's first two-seater moped, the TVS 50cc. The company became the leader in its category of sub 100 cc mopeds, having sold 7 million units.
- It also introduced the TVS Scooty, which is India's second largest brand in the scooterette segment.[10] The TVS Jive launched in November 2009 became India's first clutch-free motorbike aimed at a stress-free rider experience[11] while the unisex scooter TVS Wego is targeted at urban couples, featuring body-balance technology for easier handling.[12] On 1 June 2012, TVS Motors reported a dip of 5% in its total sales for May 2012.[13] In July 2012, TVS Motors and BMW Motored were reported to be in talks for technology sharing.[14] On 8 April 2013, BMW Motored and TVS Motor Company signed a cooperation agreement with the aim to develop and produce motorcycles in the segment below 500cc.[15] In July 2013, TVS Motor announced plans to construct a motorcycle assembly plant in Uganda and to introduce two new models suited to the East African environment. The new plant is expected to become operational in 2014.

**Table – 2 : Overall Market Returns Estimation for the year 2010-2014**

DATE	RETURNS	RELATIVE RETURN
2010	-0.0690554	0.9309446
2011	-0.1536	0.8464
2012	-0.1703011	0.8296989
2013	0.1307531	1.1307531
2014	2.4042133	3.4042133
<b>MARKET RETURN %</b>	<b>20.2709</b>	

### CALCULATION OF BETA

$$\beta = \text{COV}(R_j, R_m)$$

$$\sigma_m^2$$

$$\beta = 3.7381$$

### CALCULATION OF EXPECTED RETURN

$$R_f = 8\%$$

$$E(R_m) = 8.45$$

$$\beta = 3.7381$$

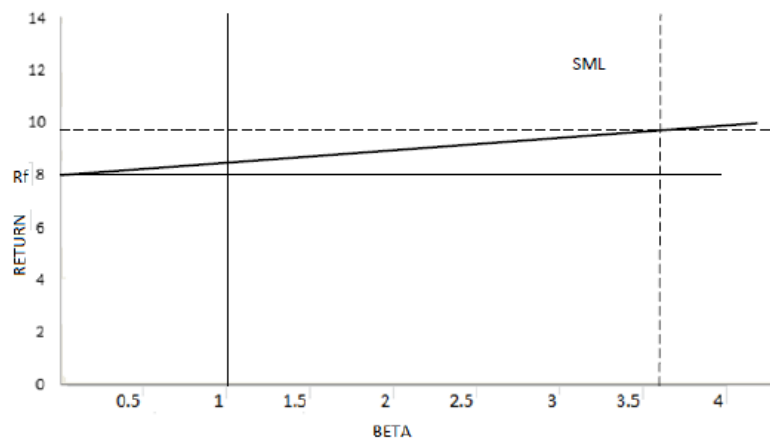
$$R_j = R_f + \beta[E(R_m) - R_f]$$

$$= 8 + 3.7381[8.45 - 8]$$

$$= 8 + [1.6821]$$

$$R_j = 9.6821$$

### SECURITY MARKET LINE OF TVS MOTORS LTD



**Figure 2 : Security Market Line of TVS Motors**

- The stock of **TVS MOTOR LTD** has been under priced. Therefore investor will buy the stock.
- The expected return of TVS MOTOR LTD is 9.6821 and Beta is 3.7381. The expected return is above the Security Market Line. Therefore it is to be under valuation of stock.

### OVERVIEW OF TCS:

- Tata Consultancy Services (TCS) was founded in 1968. Its early contracts included providing punched card services to sister company TISCO (now Tata Steel), working on an Inter-Branch Reconciliation System for the Central Bank of India,[3] and providing bureau services to Unit Trust of India.
- In 1975, TCS conducted its first campus interviews, held at IISC, Bangalore. The recruits comprised 12 Indian Institutes of Technology graduates and three IISC graduates, who became the first TCS employees to enter a formal graduate trainee programmers.
- In 1979, TCS delivered an electronic depository and trading system called SECOM for the Swiss company SIS SegalInterSettle. TCS followed this up with System X for the Canadian Depository System and automating the Johannesburg Stock Exchange. TCS associated with a Swiss partner, TKS Teknosoft, which it later acquired.
- In 1981, TCS established India's first dedicated software research and development center, the Tata Research Development and Design Center (TRDDC) in Pune. In 1985 TCS established India's first client-dedicated offshore development center, set up for client Tandem.
- In the early 1990s the Indian IT outsourcing industry grew rapidly due to the Y2K bug and the launch of a unified European currency, Euro. TCS created the factory model for Y2K conversion and developed software tools which automated the conversion process and enabled third-party developer and client implementation.
- Tata Consultancy Services Limited (TCS) is an Indian multinational information technology (IT) services, business solutions and outsourcing services company headquartered in Mumbai, Maharashtra. TCS is a subsidiary of the Tata Group and is listed on the Bombay Stock Exchange and the National Stock Exchange of India. It is one of India's most valuable companies and is the largest India-based IT services company by 2012 revenues.

### Employees:

- TCS had a total of 265,583 employees as of 31 October 2012, of whom 220,835 were based in India and 17,748 in the rest of the world.[29] TCS is one of the largest private sector employers in India,[1] and the second-largest employer among listed Indian companies (after Coal India Limited).[48] In the 2011/12 fiscal year TCS recruited a total of 70,400 new staff, of whom 61,055 were based in India and 9,345 were based in the rest of the world.[29] In the same period a total of 30,431 staff left employment with TCS, leaving a net increase of 39,969, of whom 36,232 were based in India and 3,737 in the rest of the world.[29] TCS has announced plans to recruit 60,000 graduates in the 2012/13 fiscal year.[49]

TCS was the fifth-largest United States visa recipient in 2008 (after Infosys, CTS, Wipro and Mahindra Satyam).[50]

**Table 3 : Overall Market Return Estimation for the year 2010-1014**

YEAR	RETURN	RELATIVE RETURN
2010	0.386495	1.38649
2011	0.0540155	1.05402
2012	0.1465867	1.14659
2013	0.4714748	1.47147
2014	0.0069158	1.00692
<b>MARKET RETURN %</b>	<b>19.945</b>	

#### CALCULATION OF BETA

$$\beta = \text{COV}(R_j, R_m) / \sigma_m^2$$

$$\sigma_m^2$$

$$\beta = -0.1771$$

#### CACULATION OF EXPECTED RETURN

$$R_f = 8\%$$

$$E(R_m) = 8.45$$

$$\beta = 0.1771$$

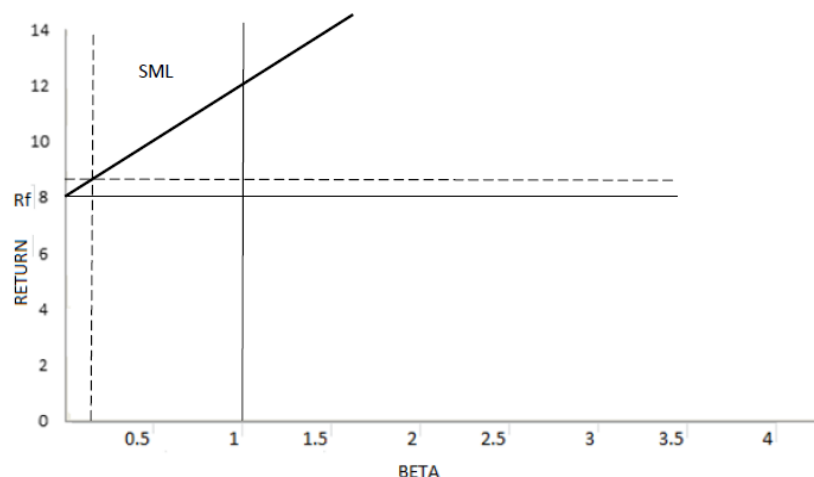
$$R_j = R_f + \beta[E(R_m) - R_f]$$

$$= 8 + 0.1771[8.45 - 8]$$

$$= 8 + [0.0796]$$

$$R_j = 8.0729$$

#### SECURITY MARKET LINE OF TCS LTD





**Figure 3 : Security Market Line of TCS Ltd**

- The stocks of **TCS LTD** has been over priced. Therefore investor will sell the stock.
- The expected return TCS LTD is 8.0729 and Beta is 1771. The expected return is below the Security Market line . Therefore it is to be over valuation of stock.

**SUMMARY OF FINDINGS****FORMULA USED FOR CALCULATION****1) CALCULATION OF EXPECTED RETURN**

$$(R_j) = R_f + \beta * [E(R_m) - R_f]$$

**2) CALCULATION OF BETA**

$$\beta = \frac{\text{COV}(R_j, R_m)}{\sigma_m^2}$$

$$\sigma_m^2$$
**TABLE 4 : SHOWING EXPECTED RETURN AND BETA OF SELECTED SECTOR STOCKS**

FIRMS	EXPECTED RETURN	BETA
CANARA BANK	8.927	2.0662
TVS MOTAR LTD	9.6821	3.7381
TCS	8.0796	0.1771

**TABLE 5 : SHOWING AGGRESSIVE AND DEFFENSIVE STOCKS**

AGGRESSIVE COMPANY	DEFENSIVE COMPANY
CANARA	TCS
TVS	

The findings were as detailed below:

Stocks of **CANARA, TVS TCS** were found to be aggressive stocks with higher beta value as compared to the market performance. To variation of beta signifies variation of stocks as compared to the market and it results in a higher beta value meaning the stock varies higher than market.

Stocks of **TCS** was found to be defensive stocks with lower beta value as compared to the market performance. To variation of beta signifies variation of stocks as compared to the market and it results in a lower beta value meaning the stock varies than market.

**CONCLUSIONS:**

This study examine the validity of the CAPM for the selected stocks of National Stock Exchange. The study used monthly stock returns from three selected companies listed on the NSE from 1.1.2010 to 31.12.2014.

The model, known as the “Capital Asset Pricing Model”, has come to dominate modern finance. Almost all managers who want to define a project it a brand, a factory or a corporate merger-must justify his decision partly based on the CAPM. The reason is that model tells a firm how to calculate the return that is investor demand. If the shareholder are to benefit, the returns from project must clear this “hurdle rate”.

In this analysis of Capital Asset Pricing Model, we analyse the pricing of the stocks using this model. As we know that the unsystematic risk can be eliminated by the diversification, the only risk to be accounted is the systematic risk. In Order to consider the systematic risk for analysis we have taken the CAPM.

Beta is what makes the CAPM powerful. Although an investment may face many risks, diversified investors should think only about those that are related to the market basket. Beta not only tells managers how to measure those risks, but it also allows them to translate directly



into a hurdle rate. if the future profits from a project will not exceed that rate it is not worth shareholders money.

The direct relationship between a security's expected return & its „ $\beta$ “ is called the Security Market Line (SML). The Security Market Line is thus plotted with the expected return got by CAPM. The CAPM states that the expected return on a security above that of the risk-free rates equals the security's „ $\beta$ “ multiplied by the expected excess return on the market by which the expected return is the linear function of its „ $\beta$ “. All said there are two points that is always present for the plot of the graph, the one is the zero „ $\beta$ “ & the other of the value of „ $\beta$ “ which is equal to zero is the risk-free rate and the market value of „ $\beta$ “ is the  $\beta$  equal to one. Both the points are used to plot the SML. The CAPM states that the expected return increases with increase in the risk.

The diagram (Security Market line) shows how the CAPM works. Safe investment, such as treasury bills, has a beta of zero. Riskier investments should earn a premium over risk free rate, which increases with beta. Those whose risks roughly match the markets have beta of one, by definition and should earn the market return.

Through the calculation we can determine whether stock is overpriced or under priced, if the return of individual stock is less than market return that stock is over priced and vice versa, for calculating individual return I have taken annual prices of last five years.

Through this study I was also able to understand the inherent risk of securities and how to analyse stocks based on their performance in comparison with the market.

It can be concluded that if the stock is under priced the investor can buy the stock if it is over priced the investor can sell the stock.

### **SUGGESTIONS:**

In empirical testing of CAPM, it cannot be fully rejected since the market index used in this test is surely not the “market portfolio” of what CAPM says and the securities' betas used are all estimated betas and not the true betas.

As we pointed out in the literature survey, one of the shortcomings of any ex-post test of CAPM is the difficulty in defining the market portfolio. The assumptions of CAPM imply that the market portfolio reflects the universally preferred combination of risky assets. The market portfolio in CAPM should ideally include all assets. Naturally, for testing purposes only a reasonable proxy for the market portfolio has to be used. Thus, if the market proxy is not properly defined tests of CAPM may give misleading results.

Moreover the efficient market assumptions behind CAPM is likely to be less valid in India compared to the developed country markets, where the securities trading is much more efficient in terms of greater transparency in transactions, faster and easier availability of information related to the market, shorter settlement periods, less transaction cost, greater liquidity and depth of the market, etc. Insider trading is believed to be rampant in the Indian market. The lack of transparency in the trading system facilitates insider trading. Earlier there was virtually no law against insider trading.

After SEBI was Formed, it has taken several steps to protect the small investors and prevent insider trading. In specific cases it can carry out investigations on alleged insider trading. Greater transparency in transactions will make insider trading more difficult to hide.

The only factor considered for the model is beta. The influence of other factors are not considered for analysis, this has however lead to question the validity of the model as the significant effects of the price variation and the company policies which play a vital role as the new information in the market is not considered for the analysis. Factors like size, various ratios and price momentum provide clear cases of diversion from the model's premise. This ignores too many other asset classes to be considered a viable option.

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